AMENDMENTS

IN THE CLAIMS:

1. (Cancelled)

2. (New) An integrated radio-frequency coil array, comprising:

a first coil;

a second coil located relative to the first coil; and

a third coil located relative to the first coil and the second coil, wherein the second coil and the third coil are situated such that the second coil and the third coil are electrically connected at a central ring, and the central ring falls over a central virtual ground plane of the first coil.

3. (New) The coil array of claim 2, wherein the second coil and the third coil are substantially isolated from one another and from the first coil.

4. (New) The coil array of claim 2, wherein the first coil has an imaging field of view (FOV), and the second coil and the third coil combine to span a near identical B field to that of the first coil over the imaging FOV.

5. (New) The coil array of claim 2, wherein the second coil and the third coil are a subset of the first coil.

6. (New) The coil array of claim 2, wherein the second coil and the third coil have substantially the same dimensions.

7. (New) The coil array of claim 2, wherein the second coil and the third coil share a common coil path.

8. (New) The coil array of claim 7, wherein the coil path includes reactive elements.

9. (New) The coil array of claim 8, wherein the reactive elements are chosen to cancel the coupling between the second coil and the third coil.

10. (New) The coil array of claim 2, wherein an FOV of the second coil and an FOV of the third coil are within an FOV of the first coil.

11. (New) The coil array of claim 2, wherein the second coil and the third coil are situated symmetrically within the first coil.

12. (New) The coil array of claim 2, wherein the first coil, the second coil and the third coil image simultaneously, independent of each other.

13. (New) The coil array of claim 2, wherein the first coil and a combination of the second coil and the third coil image simultaneously.

14. (New) The coil array of claim 2, wherein the second coil and the third coil image simultaneously.

15. (New) The coil array of claim 2, wherein each coil image individually.

16. (New) The coil array of claim 2, wherein the coil array design is selected from the group consisting of a birdcage, a solenoid, an Alderman-Grant resonator, a transverse electromagnetic wave (TEM) resonator, a saddle, a counter rotating coil CRC pair, a Helmholtz pair, a surface loop coil, and a surface coil.

17. (New) The coil array of claim 2, wherein the first coil, the second coil and the third coil are configured from the group consisting of a high-pass configuration, a low-pass configuration, a band-pass configuration and a band-stop configuration.

18. (New) The coil array of claim 2, wherein the first coil, the second coil and the third coil are volume type coils.

19. (New) The coil array of claim 2, wherein the first coil, the second coil and the third coil are surface type coils.

20. (New) The coil array of claim 2, wherein

the first coil is a first long birdcage comprising a first ring interconnected to a second ring,

the second coil is a second short birdcage located relative to the first long birdcage, comprising the first ring interconnected to the central ring, and

the third coil is a third short birdcage located relative to the first long birdcage and the second short birdcage, comprising the central ring interconnected to the third ring.

21. (New) The coil array of claim 20, wherein a k=1 linear mode of the second short birdcage and the third short birdcage is tuned and matched to about 50 ohms at the nuclear magnetic resonance (NMR) frequency, and the k=1 linear mode of the first long birdcage is tuned to the NMR frequency.

22. (New) The coil array of claim 20, wherein the second short birdcage and the third short birdcage are isolated from the first long birdcage when the second short birdcage and the third short birdcage are driven with currents of equal amplitudes 180 degrees out of phase.

23. (New) The coil array of claim 20, wherein the second short birdcage and the third short birdcage have substantially the same dimensions.

24. (New) The coil array of claim 23, wherein the second short birdcage and the third short birdcage are about one half the length of the first long birdcage.

25. (New) The coil array of claim 20, wherein the central ring is decoupled with respect to the first long birdcage.

26. (New) The coil array of claim 20, wherein the first long birdcage, the second short birdcage and the third short birdcage are in a high pass configuration.

27. (New) The coil array of claim 20, wherein the first long birdcage, the second short birdcage and the third short birdcage image simultaneously, independent of each other.

28. (New) The coil array of claim 20, wherein the first long birdcage and a combination of the second short birdcage and the third short birdcage image simultaneously.

29. (New) The coil array of claim 20, wherein the second short birdcage and the third short birdcage image simultaneously.

30. (New) The coil array of claim 20, wherein the coil array is a volume type coil and a final image produced by the coil array includes a combination of a homogenous mode produced by the first large birdcage and an RF gradient mode produced by the second small birdcage and the third small birdcage.

31. (New) The coil array of claim 20, further comprising:

a first inductive coupling loop coupled to the first long birdcage;

a second inductive coupling loop coupled to the second short birdcage; and

a third inductive coupling loop coupled to the third short birdcage, wherein the second inductive coupling loop and the third inductive coupling loop are overlapped to cancel a net mutual flux between the second inductive coupling loop and the third inductive coupling loop.

32. (New) The coil array of claim 20, wherein the first long birdcage is driven by a coupling method selected from the group consisting of inductive coupling and capacitive coupling.

Cont.

33. (New) The coil array of claim 32, wherein the first long birdcage is driven by a rectangular loop and the combined second small birdcage and third small birdcage is driven by a figure eight loop.

34. (New) The coil array of claim 32, wherein a homogenous mode produced by the first long birdcage and a radio frequency gradient mode produced by the combined second small birdcage and third small birdcage are combined along a coil axis.

35. (New) The coil array of claim 32, wherein the first long birdcage and the combined second small birdcage and third small birdcage are operated substantially independent of each other.

36. (New) The coil array of claim 32, wherein the first long birdcage, the second short birdcage and the third short birdcage image simultaneously, independent of each other.

37. (New) The coil array of claim 32, wherein the first long birdcage and a combination of the second short birdcage and the third short birdcage image simultaneously.

38. (New) The coil array of claim 32 wherein the second short birdcage and the third short birdcage image simultaneously.

39. (New) The coil array of claim 20 wherein an RF gradient mode is generated along a coil axis of a combined second small birdcage and third small birdcage.

40. (New) The coil array of claim 39 wherein the RF gradient mode is in quadrature.

41. (New) The coil array of claim 39 wherein the RF gradient mode comprises two linear RF gradient modes orthogonal to one another.

42. (New) A resonance imaging/analysis system, comprising:

a coil array as described in claim 2; and

a means for processing RF signals which are at least one of received from the coil array and transmitted from the coil array in order to obtain a resonance image/analysis.

IN THE DRAWINGS:

A formal request for approval of drawing changes is submitted herewith. The proposed changes are as follows:

Fig. 9 - The local RF Coil has been replaced with the coil array of the present invention.